

# Europeana Semantica

## Remarks on the motivations for our semantic foundations

Prof. Dr. Stefan Gradmann  
Humboldt-Universität zu Berlin / School of Library and Information Science  
[stefan.gradmann@ibi.hu-berlin.de](mailto:stefan.gradmann@ibi.hu-berlin.de)

# Presenter's Context:

Digital Humanities, Digital Libraries & Open Access



- Background in **literary scholarship** (work on Joyce, Kafka, Arno Schmidt, Semiology, Greek Mythology), **Digital Libraries** and **Digital Humanities**
- International advisor to “**Our Cultural Commonwealth**” (American Council of Learned Societies Report on Cyberinfrastructure for the Humanities and Social Sciences)
- Additional background: **traditional library automation** (Pica/OCLC)
- Building the European Digital Library / **Europeana**
- Currently teaching Library and Information Science at Humboldt University / Berlin (Knowledge Management)

- Background: **i2010** and the **Google challenge**
- Putting semantics on the agenda: EC working group on **DL interoperability recommendations** ...
- ... as taken up in **Europeana functional specifications** and architecture (D2.5)
- Where do we go from here? **Proposals, plans & prospects**
  - EuropeanaConnect, Europeana1.0, Rose ...
- Semantics: **why, for whom?**
  - Digital Humanities Scholars
- Strategic value of Europeana semantic foundations

# How it all started ...



- 2005: Excitement about **Google Books** (Jeanneney: “Google defie l'Europe” => Chirac, Schröder)
- => EC i2010 agenda with Digital Libraries as one of 3 'flagship initiatives': the setting up of the **European Digital Library** as a “common multilingual access point to Europe’s distributed digital cultural heritage including all types of cultural heritage institutions”, announced by Commissioner Reding in September 2005
  - **2008**: at least 2 million digital objects; multilingual; searchable and usable; work towards including archives.
  - **2010**: at least 6 million digital objects; including also museums and private initiatives.
- DL Interoperability WG active from January to June 2007 with as main mission to
  - Contribute to the **short term DL agenda** => identify areas for short term action and recommend elements of an action plan (**list of prioritised feasible options**)

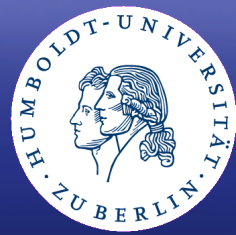


# DL Interoperability Working Group Composition



- Emmanuelle **Bermes** (Bibliothèque nationale de France / F),
- Mathieu **Le Brun** (Centre Virtuel de la Connaissance sur l'Europe / LU)
- Sally **Chambers** (The European Library Office / TEL),
- Robina **Clayphan** (The British Library / GB),
- Birte **Christensen-Dalsgaard** (State and University Library Aarhus / DK),
- David **Dawson** (The Museums, Libraries and Archives Council / GB),
- Stefan **Gradmann** (Hamburg University Computing Center / D, Moderation),
- Stefanos **Kollias** (Technical University of Athens / GR),
- Maria Luisa **Sanchez** (Ministerio de Cultura / ES),
- Guus **Schreiber** (Vrije Universiteit Amsterdam / NL),
- Olivier **de Solan** (Direction des Archives de France / F)
- Theo **van Veen** (Koninklijke Bibliotheek / NL)
- EC: Pat **Manson** Chair, Marius **Snyders** (European Commission, DG INFSO, Cultural Heritage and Technology Enhanced Learning)
- Federico **Milani** (European Commission, DG INFSO, eContentPlus)

# The Interoperability Abstraction Layer Cake



Abstract



**semantic**  
allowing to access similar classes of objects and services across multiple sites, with multilinguality of content as one specific aspect

**Interoperability Group Focus => Europeana**

**functional / pragmatic**  
based on a common set of functional primitives  
or on a common set of service definitions

**syntactic**  
allowing the interchange of metadata and protocol elements

**technical/basic**  
common tools, interfaces and infrastructure  
providing uniformity for navigation and access

Concrete

# Towards a Semantic Agenda for Europeana



- DL interoperability group identified semantically enabled functionality as the **critical, distinguishing feature** of a European Digital Library
- The final report states

“Semantic web technologies can be used to create semantic interoperability in three areas:

- interoperability of the federated content resources on **concept level**
- semantic interoperability of EUDL on **user interface level**
- semantic interoperability of EUDL for **automated processing**

both for EUDL being **plugged in** emergent semantically aware WWW services and for **integrating** such services in the functional scope of EUDL.”

# Short Term Agenda Issues for 2008 (2 out of 10)



- **(8) Basic Semantic Interoperability**

Make existing metadata and the **controlled terminology** used therein machine understandable to create a data layer ready for semantic query methods. The method of choice for conversion is SKOS, but use of OWL or RDF may be appropriate in some application scenarios.

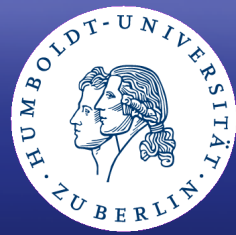
- **(9) Awareness Building regarding Semantic Interoperability**

Demonstrate the added value to be gained from semantic interoperability and the **short term viability of converting existing controlled terminology** in experimentation environments relevant to the EuDL. These environments also to be used to market semantic interoperability functions of EuDL as **our unique selling point**.

- More at <http://bnd.bn.pt/seminario-conhecer-preservar/doc/Stefan%20Gradmann.pdf>.



# ... as taken up in Europeana



## Draft functional specification (D2.5) statements:

### ■ **A semantic interface for Europeana**

“A central principle for building Europeana is that a network of semantic resources will be used as the primary level of user interaction.”

### ■ **Interaction with data providers**

“Aggregators and other content providers need to provide identifiers, metadata files, **vocabularies in SKOS form, links to semantic nodes**, licensing and rights information and access to the original digital objects.”

### ■ **Terminology mapping**

“The work to turn this [collection of Europeana terminologies] in a 'European Ontology' and more specifically the **mapping of these concept schemes** cannot be done in the context of Europeana alone but must be made be part of the wider EC research agenda. However, Europeana will have to contain instruments that can be used to produce such mappings and to promote best practices.”

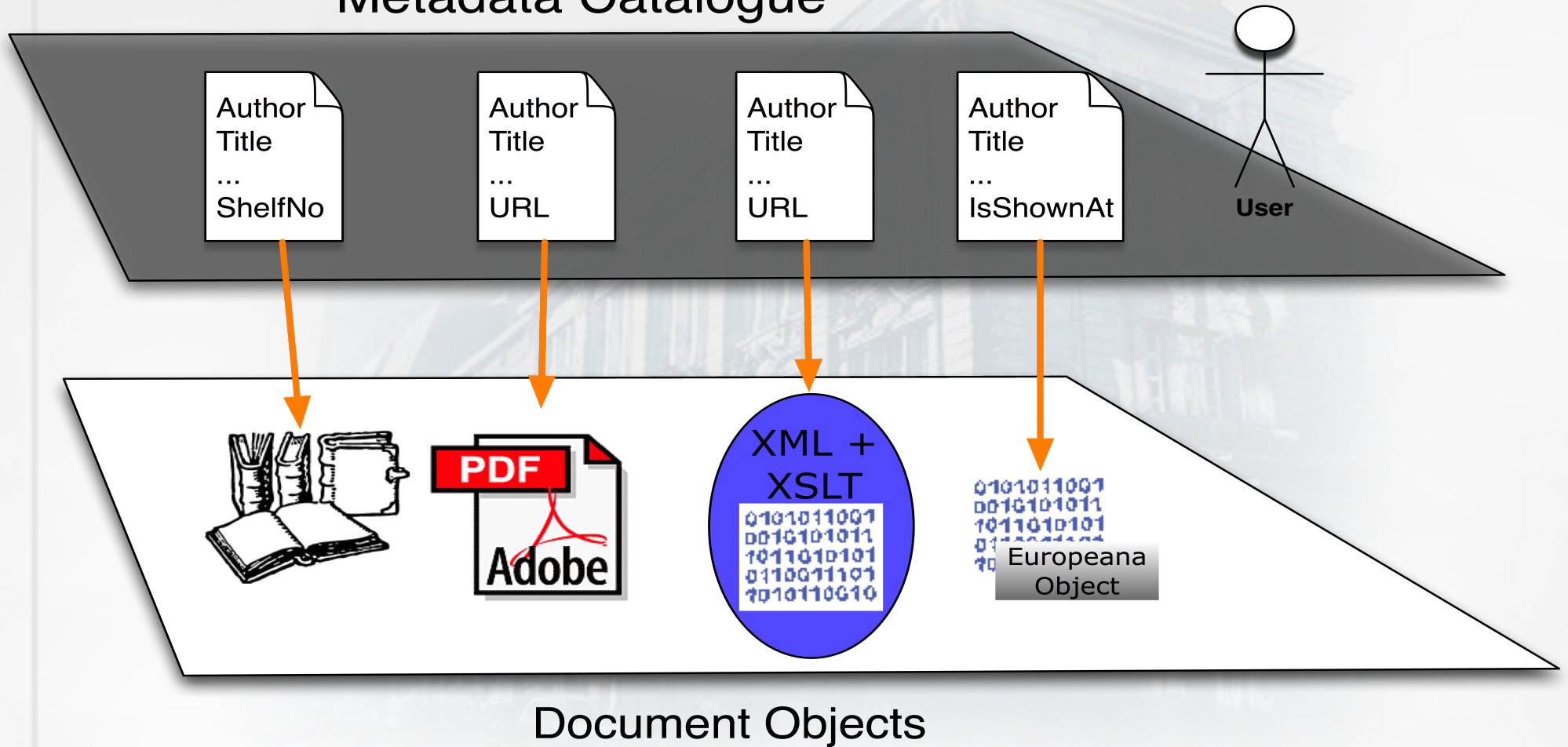
### ■ **Make Europeana**

**a network of inter-operating object surrogates enabling semantics based object discovery and use.**

# Europeana is not Yet Another Digital Library



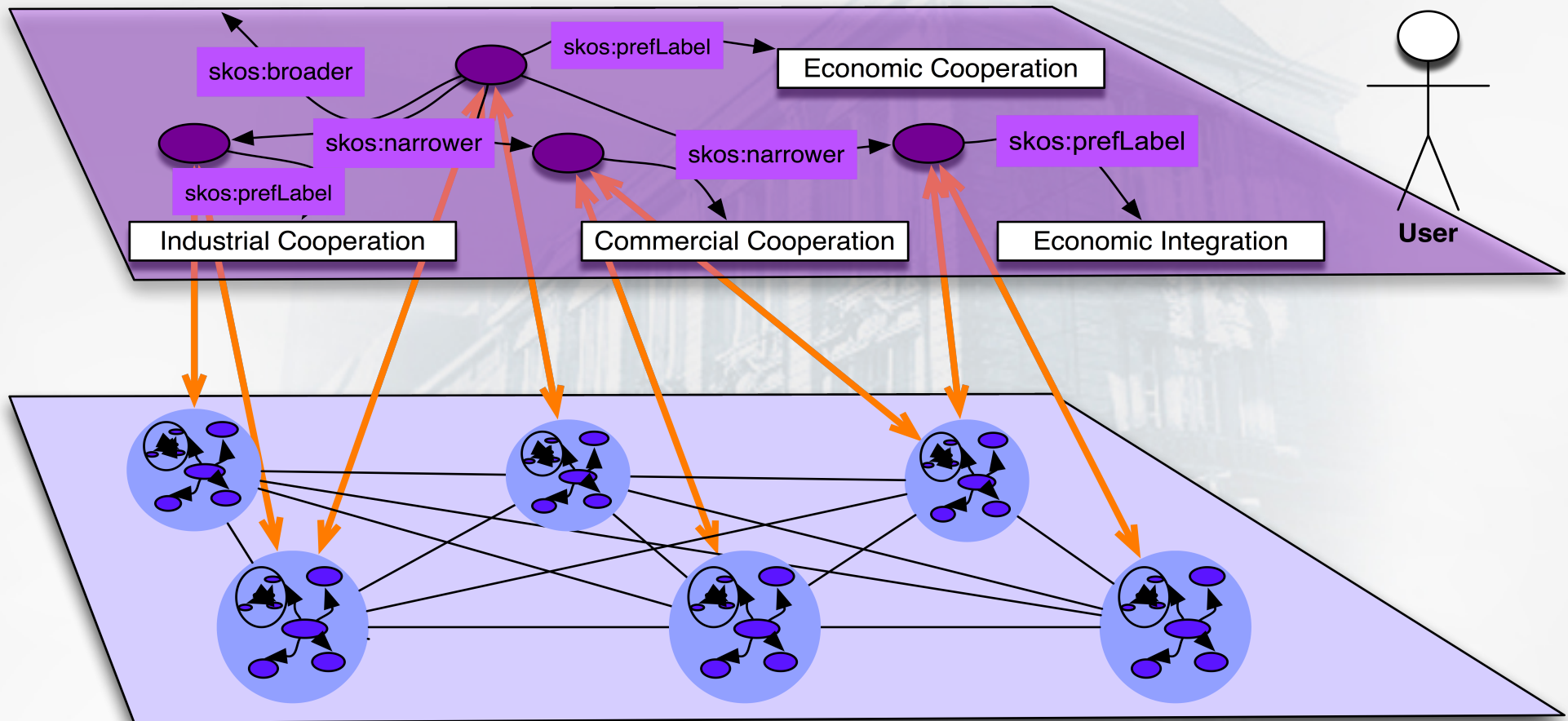
## Metadata Catalogue



# Document Objects, Metadata and Semantic Networks

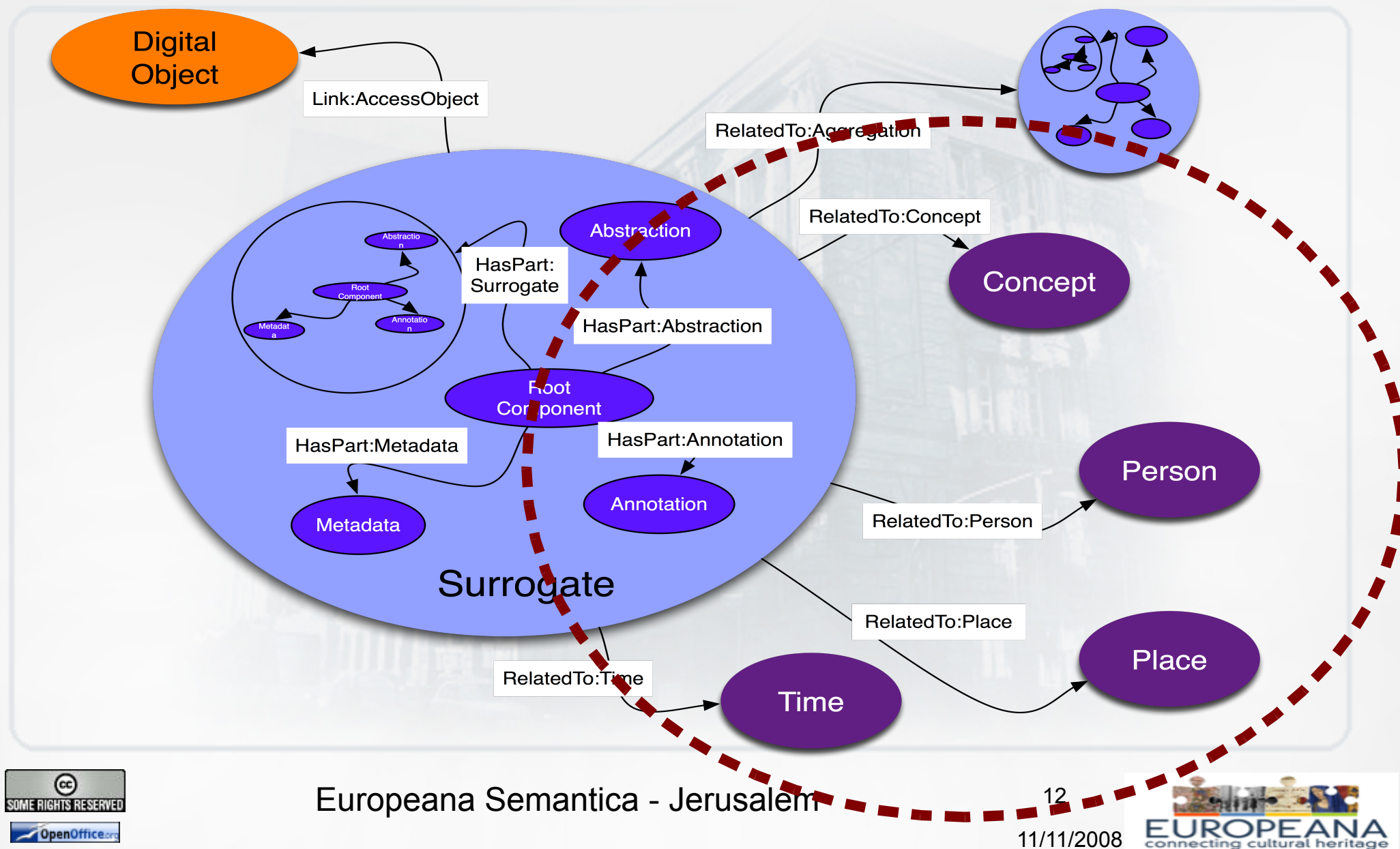


## Semantic Network



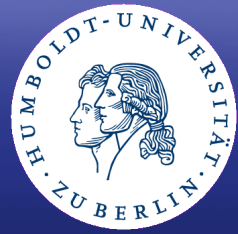
## Networked Surrogates

# Contextualisation of Europeana Surrogate Aggregations



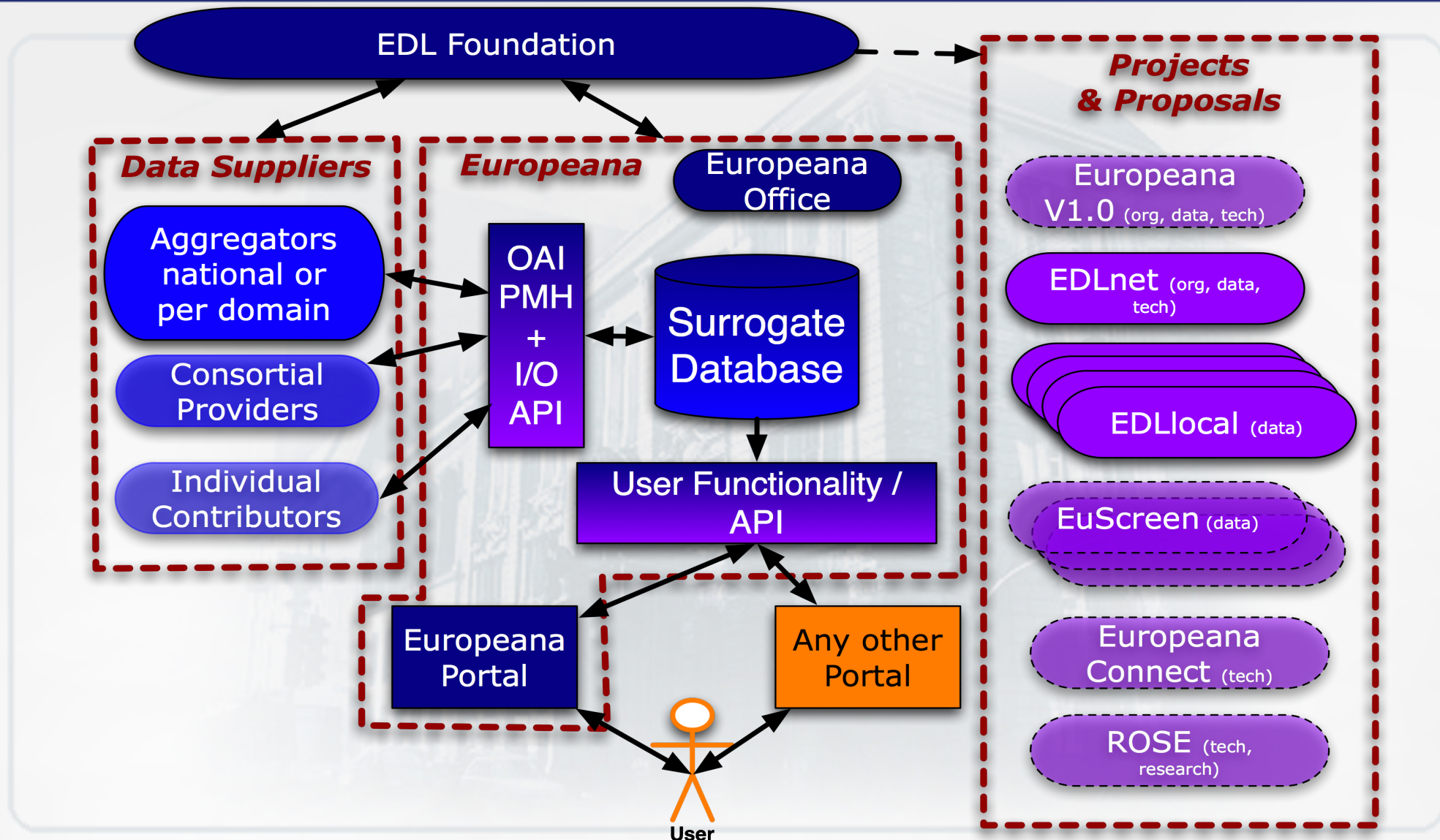


# ... and further developed in projects planned and proposed for EC funding



- **Europeana V1.0 (eContent+ TN, implementation)**
  - Providing Europeana infrastructure components
  - Building parts of the core functionality of Europeana
  - Building the Europeana organisation
- **EuropeanaConnect (eContent+ BPN, implementation)**
  - Integrate work from different (mostly EU funded) development activities to provide additional core and advanced functionality with WP1 being about “Creating the Europeana Semantic Layer”
- **ROSE (ICT Strep, Research)**
  - semantic interoperability,
  - ontology matching, ontology mapping, mapping evolution,
  - co-reference discovery and
  - generalised surrogate building machine
- Not to mention Europeana Local, Athena, European Film Gateway, Apenet & all the rest ...

# Europeana 1.0 Big Picture



# Semantics: for whom?



## ■ Citizens

- Main focus of Europeana work to date, cf. some details at [http://www.europeana.eu/public\\_documents/D3.1\\_User\\_use\\_cases\\_for\\_n](http://www.europeana.eu/public_documents/D3.1_User_use_cases_for_n) (Use Cases) and [http://www.europeana.eu/public\\_documents/IRN-europeana\\_surveys\\_sun](http://www.europeana.eu/public_documents/IRN-europeana_surveys_sun) (focus groups)

## ■ Machines

- Make European cultural heritage part of future global semantic processing networks

## ■ Digital Humanities Scholars

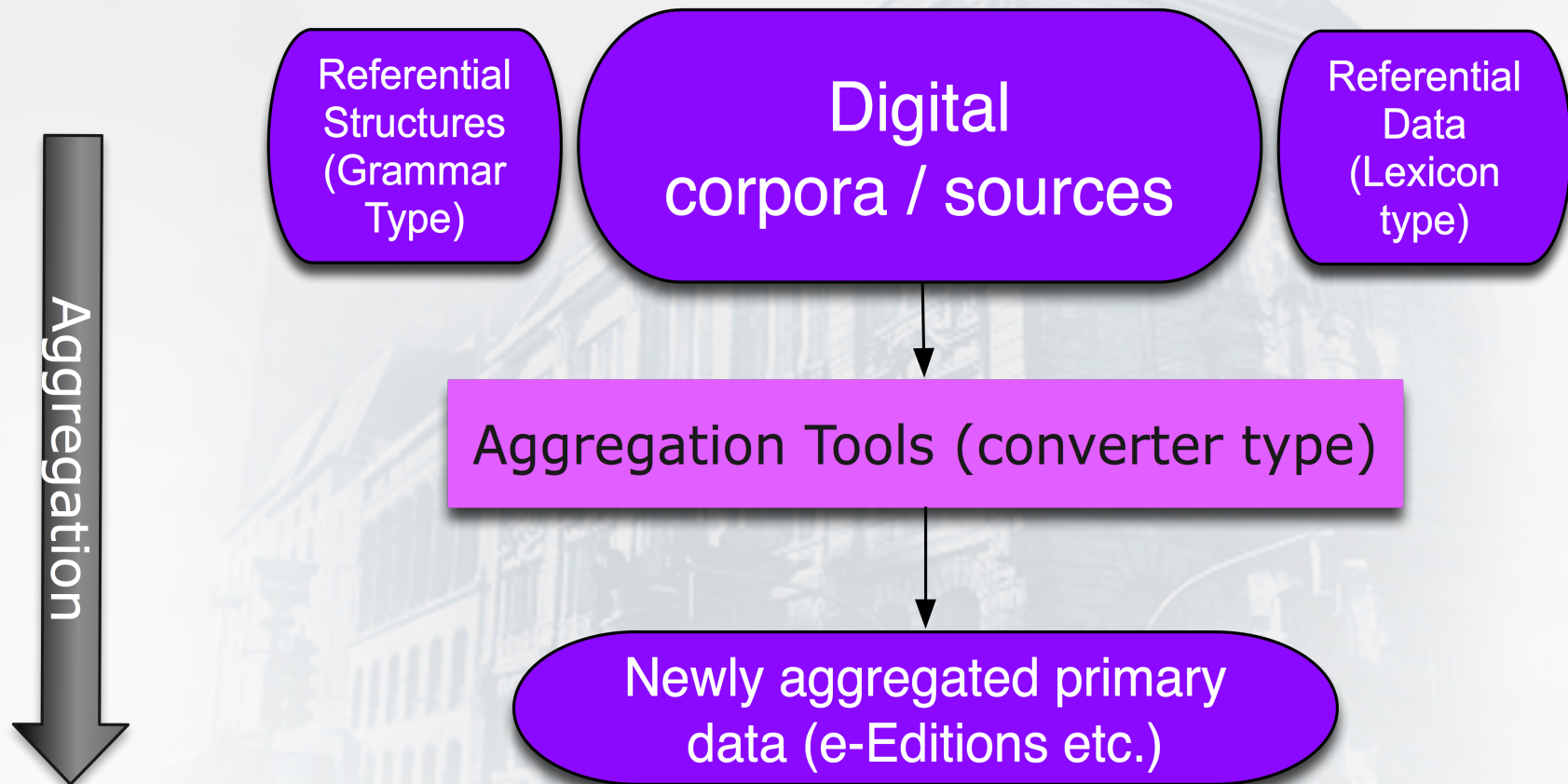
- Humanities scholars always have been concerned with reaggregation and interpretation of cultural heritage corpora (literature, music, artwork – all kinds of cultural artefacts)
- Europeana enabling automated semantic operations over large cultural heritage corpora creates entirely new opportunities for the digital humanities!



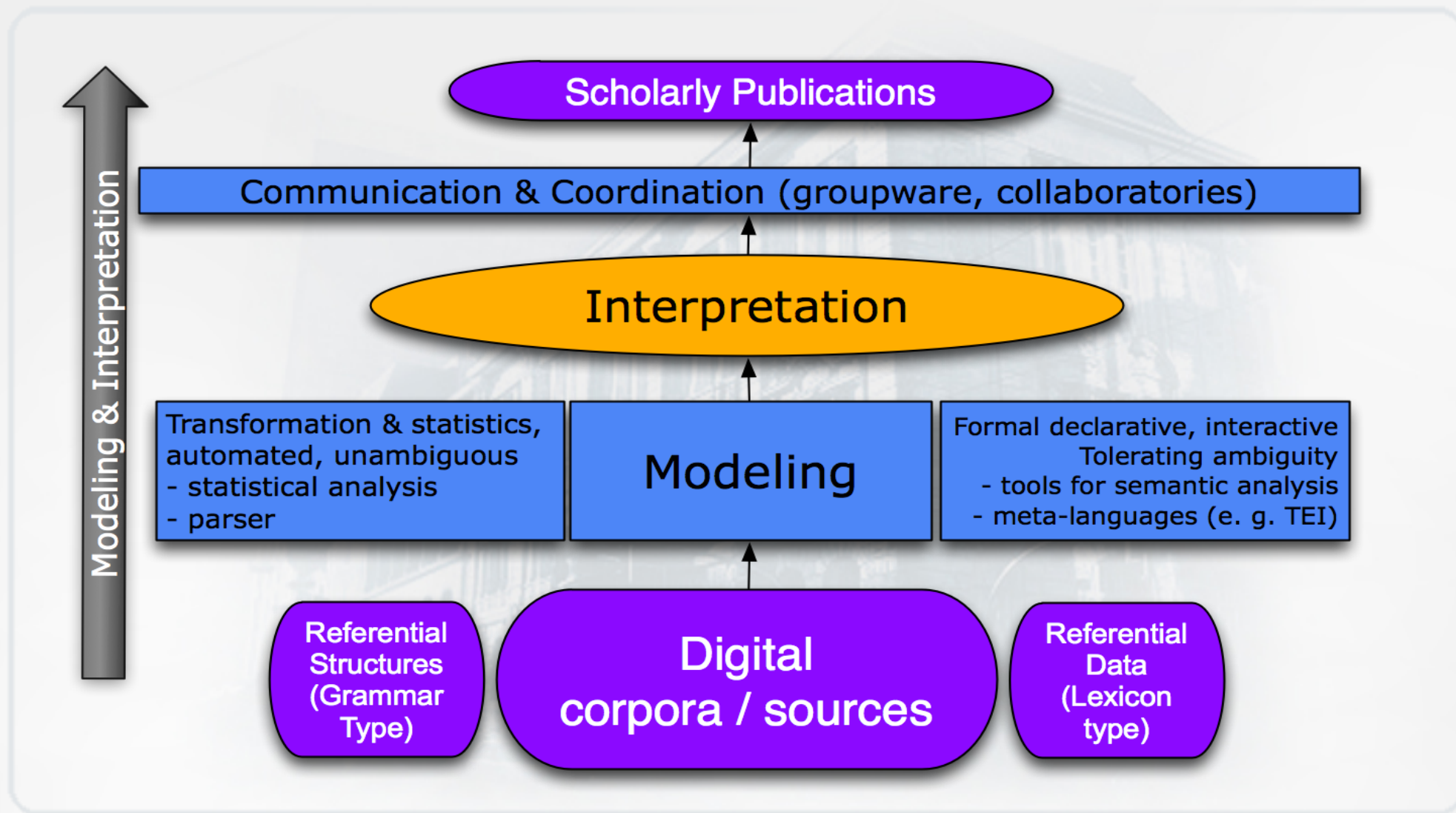
# Scholarship in the digital era



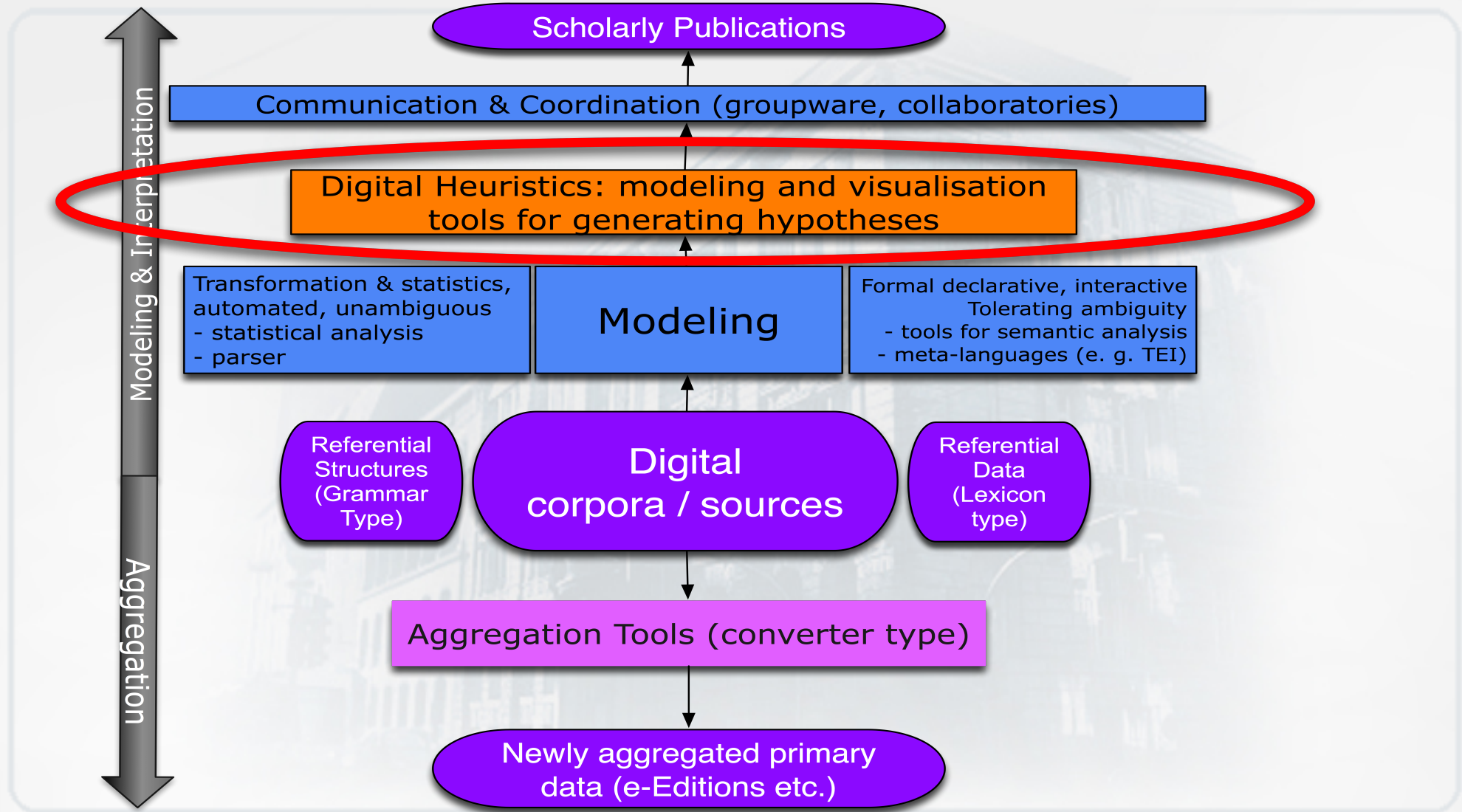
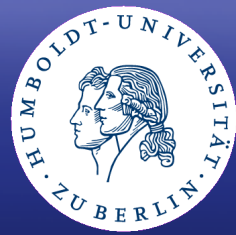
# Processing of source data in the Humanities: **aggregation** ...



# ... modeling ...

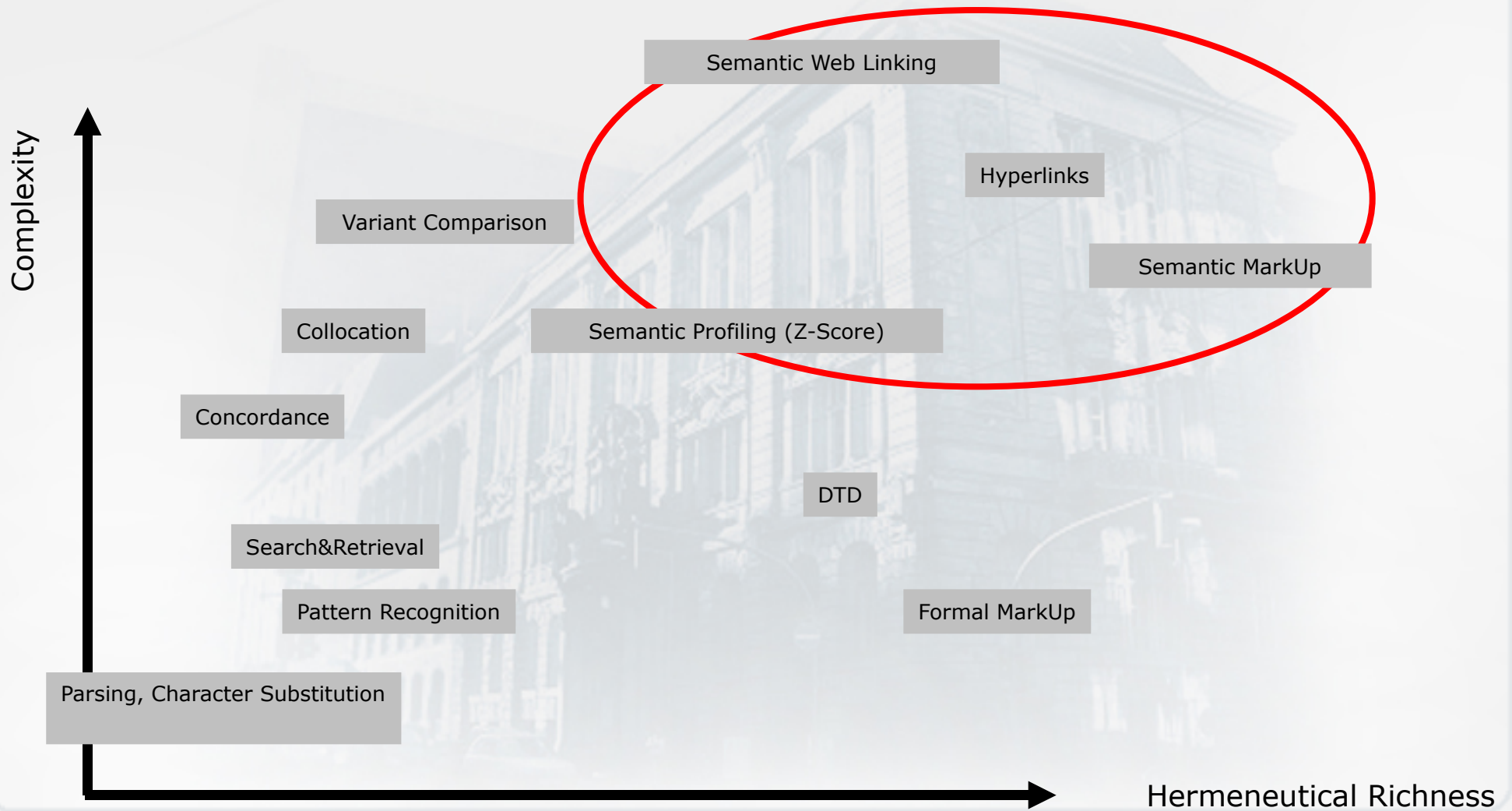


# ... and Digital Heuristics?



# Digital Document Value Add-On

(c) J.-C. Meister





# Open Scholarly Communities on the Web

partly (c) Paolo d'Iorio / Michele Barbera



## ■ Objective

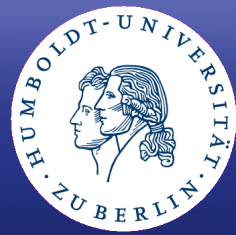
- Create social networks of specialists in a humanities research area
- Enable 'web scholarship'
- Similar to academies in the 17<sup>th</sup> century

## ■ Barriers

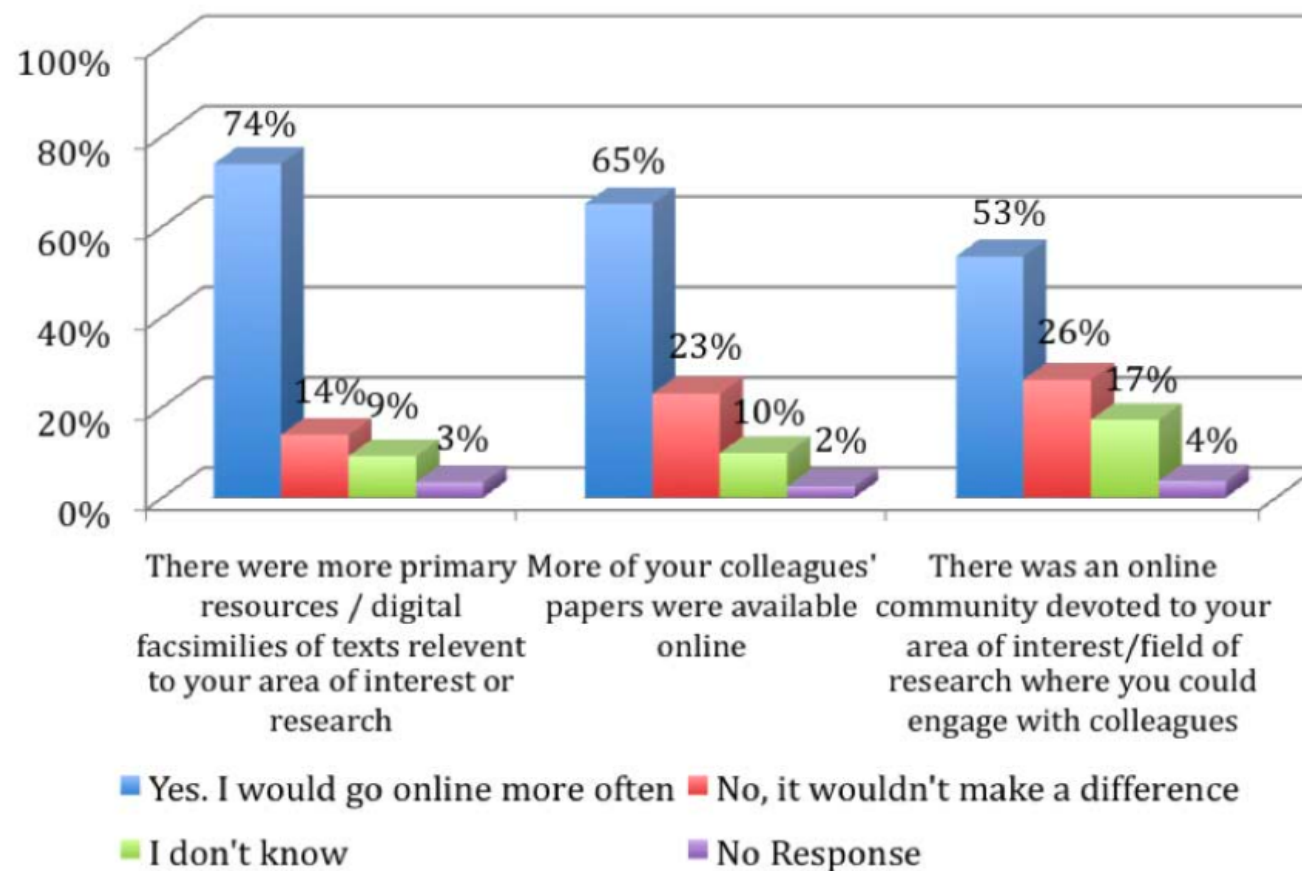
- Scholars lack digital literacy
- Public institutions tax digital access to public domain
- Publishers protect old business models
- Lack of content, lack of open sources

# Online Survey of Humanities Scholars

Christine Madsen / Oxford Internet Institute



## Would you go online more often if:



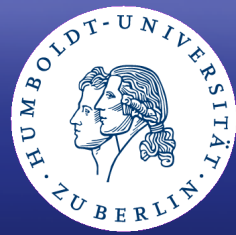
# Some Work Done / Ongoing



- **HyperNietzsche**
- COST A32: “**Open Scholarly Communities on the Web**” (13 countries)
  - April 2006 - December 2010
  - to establish and foster the growth of Scholarly Communities on the Web
  - to create a digital infrastructure for the humanities
  - to define an appropriate legal, economic and social framework
- eContent+ project: “**Discovery**. Digital semantic corpora for virtual research in philosophy” (6 partners)
- Key partners in all scenarios are **CNRS ITEM** (Paolo d'Iorio) and **NetSeven** (Michele Barbera)
- I am leading A 32 WG 2 (Technology) together with Michele Barbera



# Components Created to Work on this Corpus



## ■ Hyper

- “... a web application created to help scholars in accessing primary sources (like manuscripts) and to share the result of their researches.”
- pre-Discovery (PHP, PostgreSQL)

## ■ Talia

- “... a semantic web digital library system, designed to help philosophy researchers and scholars in their work with digital content and provide them with all the resources needed for their work.”
- Discovery (Ruby) => <http://www.talia.discovery-project.eu/>

## ■ Philospace

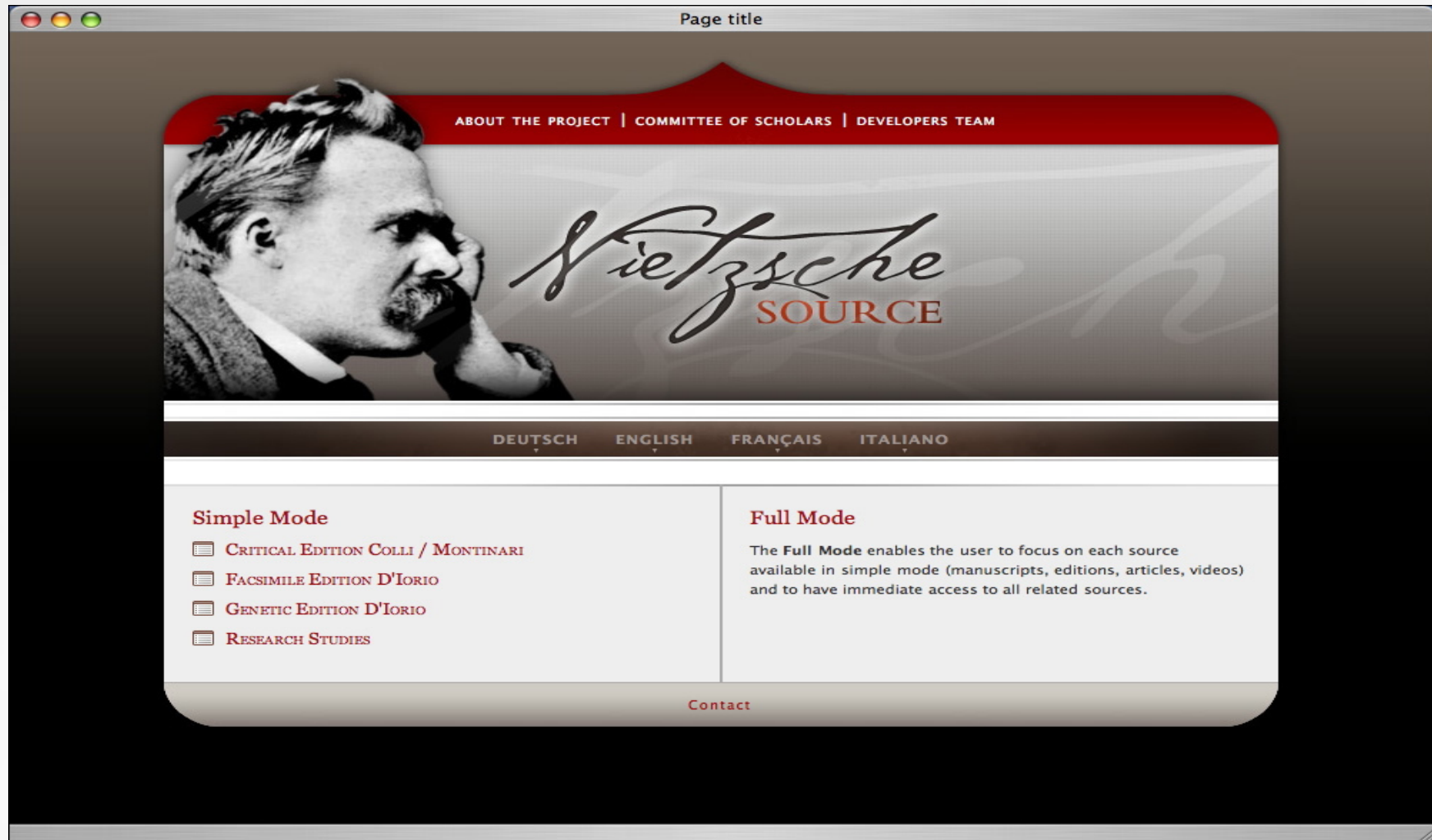
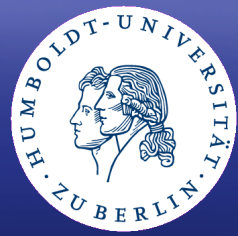
- “... is an innovative client application that allows users to browse philosophical content, published in the Talia platform, leveraging the power of semantic knowledge associated to such contents.”
- Discovery (Dbin 2.0, => <http://dbin.org>)

# Discovery Corpus: Digitised Manuscripts



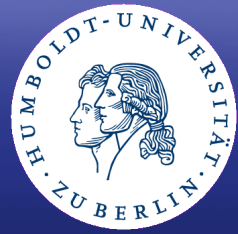
Philosophy	Literature	History
Friedrich Nietzsche CNRS-ITEM, Paris	Gustav Flaubert CNRS-ITEM, Paris	Fernand Braudel MSH-Paris
Ancient / Modern Philosophy CNR-ILIESI, Roma	Marcel Proust CNRS-ITEM, Paris	
Arthur Schopenhauer Universities Pisa / Mainz	Paul Valéry CNRS-ITEM, Paris	
Contemporary philosophy RaiNet, Roma	Virginia Woolf Leicester / London	
Ludwig Wittgenstein WAB, Bergen		

“To work towards making all good things part of the common good and all things free to those who are free”





# Hyper: Digitisation, Presentation (1)



Simple Mode  
**NietzscheSource**  
Facsimile Edition

Home > D'Iorio Facsimile Edition > Manuscripts > Copybook > U-II-5

MI1 MI2 MI3 MII1 MII2 MIII3 MIII5 MIII7 **UII5**

Large octavo notebook (14 x 19,5cm) bound in black. 250 lined pages often used only on the odd side; p. 53f and p. 58 in Albert Brenners hand, p. 113f in an unknown hand; p. 1-4 philological notes; thoughts, studies for *Schopenhauer as Educator*, *Richard Wagner in Bayreuth*; plans and aphorisms from the *All Too Human* period. Location: Weimar, Goethe- und Schiller-Archiv, 71/115

Collegati a # in questa pagina

# Hyper: Digitisation, Presentation (2)



# Hyper: Transcription, Presentation (1)



Browse N II 6

> Home > Notebooks > N-II-6

Panorama Synoptic Context

N II 6,5[1]

transcriptions: hnm1

V. Zapf, transcription of N II 6,5[1] (vzapf-23)

image HNML Linear diplo. Print

Im Jahr 1877 wusste ich von der Zukunft gar nichts zu verlangen. Selbst Gesundheit nicht – denn diese ist ein Mittel – w a s hätte ich mit diesem Mittel erreichen wollen?

Criteria.

N-II-6,2

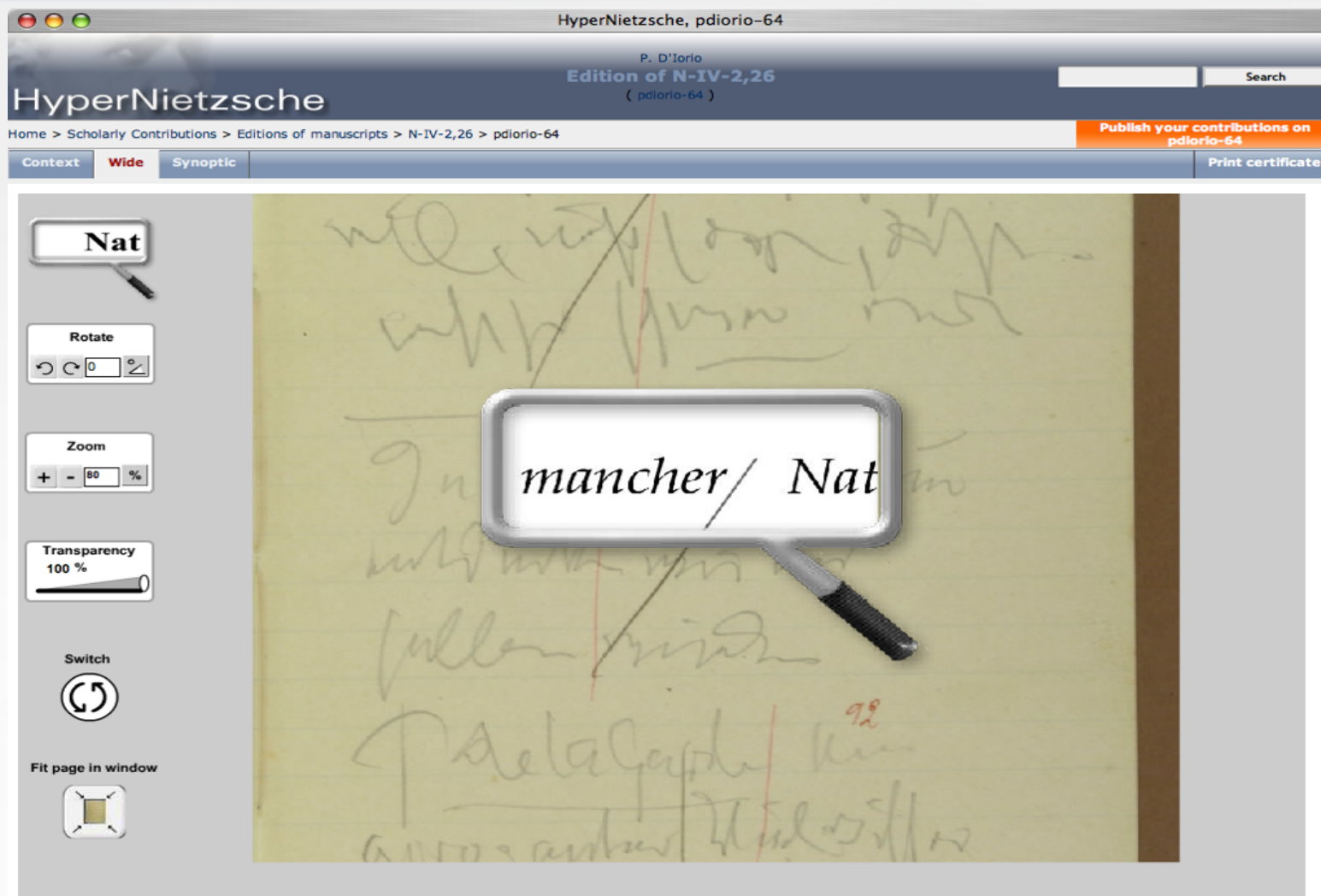
N-II-6,3

N-II-6,4

N-II-6,5



# Hyper: Transcription, Presentation (2)



# Hyper: Sources and Editions (synoptical)



NietzscheSource, colli-montinari, Search results

Simple Mode  
NietzscheSource  
Colli-Montinari Edition

philosophie Search  
Advanced Search

Home > Colli-Montinari > Search: philosophie

### List of works

- AC (6)
- DS (3)
- DW (2)
- GD (8)
- GM (12)
- GT (6)
- HL (4)
- MA (25)
- 1
- 8
- 9 Chemie der Begriffe und Empfindungen.
- 14 Der Geist der Wissenschaft im Theil, nicht im Ganzen mächtig.
- 15 Der Störenfried in der Wissenschaft.
- 35 Ersatz der Religion.
- 37 Vom Dufte der Blüten berauscht.
- 42 Zur Beruhigung.
- 45 Trotzdem.
- 76 Moralität und Erfolg.
- 88 Greis und Tod.
- 116 Der doppelte Kampf gegen das Uebel.
- 117 Gram ist Erkenntniss.
- 118 Die Wahrheit in der Religion.
- 120 Beliebiges Nachwachen.

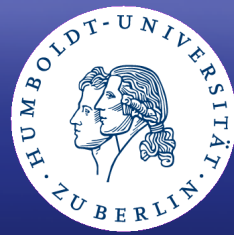
### Search Results

86 occurrences of the words 'philosophie' in the critical edition Colli-Montinari

Select All | Deselect All Print Results

- 42 ☒ MA, 1  
...bis zum letztin veröffentlichten „Vorspiel einer **Philosophie** der Zukunft“: sie enthielten allesammt, hat man mir...
- 43 ☒ MA, 8  
...— Nach einer so artigen Antwort rath mir meine **Philosophie**, zu schweigen und nicht mehr weiter zu fragen; zumal...
- 44 ☒ MA, 9, Chemie der Begriffe und Empfindungen.  
...Egoismus, Wahrheit aus Irrthümern? Die metaphysische **Philosophie** half sich bisher über diese Schwierigkeit hinweg,... ..Wesen des „Dinges an sich“ heraus. Die historische **Philosophie** dagegen, welche gar nicht mehr getrennt von der...
- 45 ☒ MA, 14, Der Geist der Wissenschaft im Theil, nicht im Ganzen mächtig.  
...unpersönlich, als in ihren Theilen behandelt. Bei der **Philosophie** nun gar, als bei der Spitze der gesammten... ..der Erkenntniss überhaupt aufgeworfen, und jede **Philosophie** hat unbewusst die Absicht, ihr den höchsten Nutzen... ..den wissenschaftlichen Einzelgebieten und der **Philosophie**. Letztere will, was die Kunst will, dem Leben und... ..keinen Philosophen gegeben, unter dessen Händen die **Philosophie** nicht zu einer Apologie der Erkenntniss geworden...
- 46 ☒ MA, 15, Der Störenfried in der Wissenschaft.  
...7. Der Störenfried in der Wissenschaft. — Die **Philosophie** schied sich von der Wissenschaft, als sie die Frage...
- 47 ☒ MA, 35, Ersatz der Religion.  
...27. Ersatz der Religion. — Man glaubt einer **Philosophie** etwas Gutes nachzusagen, wenn man sie als Ersatz... ..welche die Religion befriedigt hat und nun die **Philosophie** befriedigen soll, nicht unwandelbar sind; diese... ..Befriedigung, sondern Vernichtung verdienen. Eine **Philosophie** kann entweder so nützen, dass sie jene Bedürfnisse... ..weniger unterhalten, als durch eine metaphysische **Philosophie**. Von der Kunst aus kann man dann leichter in eine...
- 48 ☒ MA, 37, Vom Dufte der Blüten berauscht.  
...Schoosse tragend. Diess Resultat führt zu einer **Philosophie** der logischen Weltverneinung : welche übrigens sich...

# Hyper: Mory Synoptical Features



Untitled Document

Contact | About the project | HN Developers | Help | Visit the Nietzsche News Center

Full Mode  
**NietzscheSource**

◀ N IV 1,1 ▶

Home > Catalogues > D'Iorio > Primary Sources > N IV 1 > N IV 1,1

Change Layout

Facsimile | **Trascrizioni** | Edizioni | Percorsi | Commenti

Facsimile di S. Viola

zoom Download (4,2 MB)

Facsimile | Trascrizioni | **Edizioni** | Percorsi | Commenti

Trascrizione di I. Gerike

HNML Linear **diplo.** Print

Man erstrebt Unabhängigkeit (Freiheit) um der Macht willen, nicht umgekehrt

Criteria..

Facsimile | Trascrizioni | Edizioni | Percorsi | **Commenti**

Author	Title	Language	Date	Siglum
Andrea Bertino	L'eroico-idillico Epicuro di Nietzsche	it	03/03/2006	abertino-1
Alessandro Fambrini	Ola Hansson, Brandes, Langbehn: Un Radicalismo pangermanico	it	15/09/2003	afambrini-1
Anna Hartmann Cavalcanti	"Fragmento 12(1): a crítica do jovem Nietzsche à metafísica da vontade de Schopenhauer"	po	14/04/2004	ahartmanncaval
Andrea Orsucci	L'enciclopedia nietzscheana delle 'scienze dello spirito' nelle discussioni del primo '900: alcune corrispondenze. Nuove prospettive storiografiche	it	15/09/2003	aorsucci-1



# Talia: Refactoring Hyper using Semantic Web (1)



```
N-V-3,71.rdf (modified)
N-V-3,71.rdf (/Users/gradmans/Documents/4-europe/Projects/Discovery/RDF_Samples/)

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<rdf:RDF
  xmlns:taliadom="http://trac.talia.discovery-project.eu/wiki/SampleDomainOntology#"
  xmlns:default="http://default.dummy/"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
  xmlns:foaf="http://xmlns.com/foaf/0.1/"
  xmlns:local="http://www.talia.discovery-project.org/sources/"
  xmlns:dcns="http://purl.org/dc/elements/1.1/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:hyper="http://www.hypernetzsche.org/ontology/"
  xmlns:talias="http://trac.talia.discovery-project.eu/wiki/StructuralOntology#"
  xmlns:talia_db="http://talia.discovery-project.eu/wiki/DatabaseDuples#"
  xmlns:luccadom="http://trac.talia.discovery-project.eu/wiki/LuccaOntology#"
  xmlns:owl="http://www.w3.org/2002/07/owl#"
  >
  <rdf:Description about="http://www.talia.discovery-project.org/sources/N-V-3,71">
    <rdf:type>
      <rdf:Description rdf:about="http://www.w3.org/2000/01/rdf-schema#Resource"/>
      <rdf:Description rdf:about="http://www.hypernetzsche.org/ontology/Page"/>
      <rdf:Description rdf:about="http://www.hypernetzsche.org/ontology/Manuscript"/>
    </rdf:type>
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    <hyper:width>2454.00</hyper:width>
    <talia_db:primary_source>false</talia_db:primary_source>
    <talia_db:workflow_state>0</talia_db:workflow_state>
    <hyper:part_of>
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    </hyper:part_of>
    <talia_db:uri>http://www.talia.discovery-project.org/sources/N-V-3,71</talia_db:uri>
    <dcns:title>N V 3,71</dcns:title>
    <hyper:height>4080.00</hyper:height>
  </rdf:Description>
</rdf:RDF>
```

# Talia: Refactoring Hyper using Semantic Web (2)



hyper\_ontology Protégé 3.4 beta (file:/Users/gradmans/Documents/4-europe/Projects/Discovery/hyper\_ontology.pprj, OWL / RDF Files)

File Edit Project OWL Reasoning Code Tools Window Help

Subclass Explorer

For Project: hyper\_ontology

Asserted Hierarchy

- owl:Thing
  - ContributionContentType
    - BlackAndWhite
    - Chronologic
    - Color
    - Diplomatic
    - Dynamic
    - Facsim
    - GenericXML
    - Genetic
    - GreyScale
    - HNML
    - HTML
    - Linear
    - ParagraphInteractive
    - PDF
    - PlainText
    - RowInteractive
    - TEI
    - Thematic
    - Ultradiplomatic
    - WitTEI
    - WordInteractive
  - MaterialType
  - Source

CLASS EDITOR

For Class: Facsim (instance of owl:Class) ☐ Inferred View

Property	Value	Lang
rdfs:comment		

Annotations

Asserted Conditions

NECESSARY & SUFFICIENT

NECESSARY

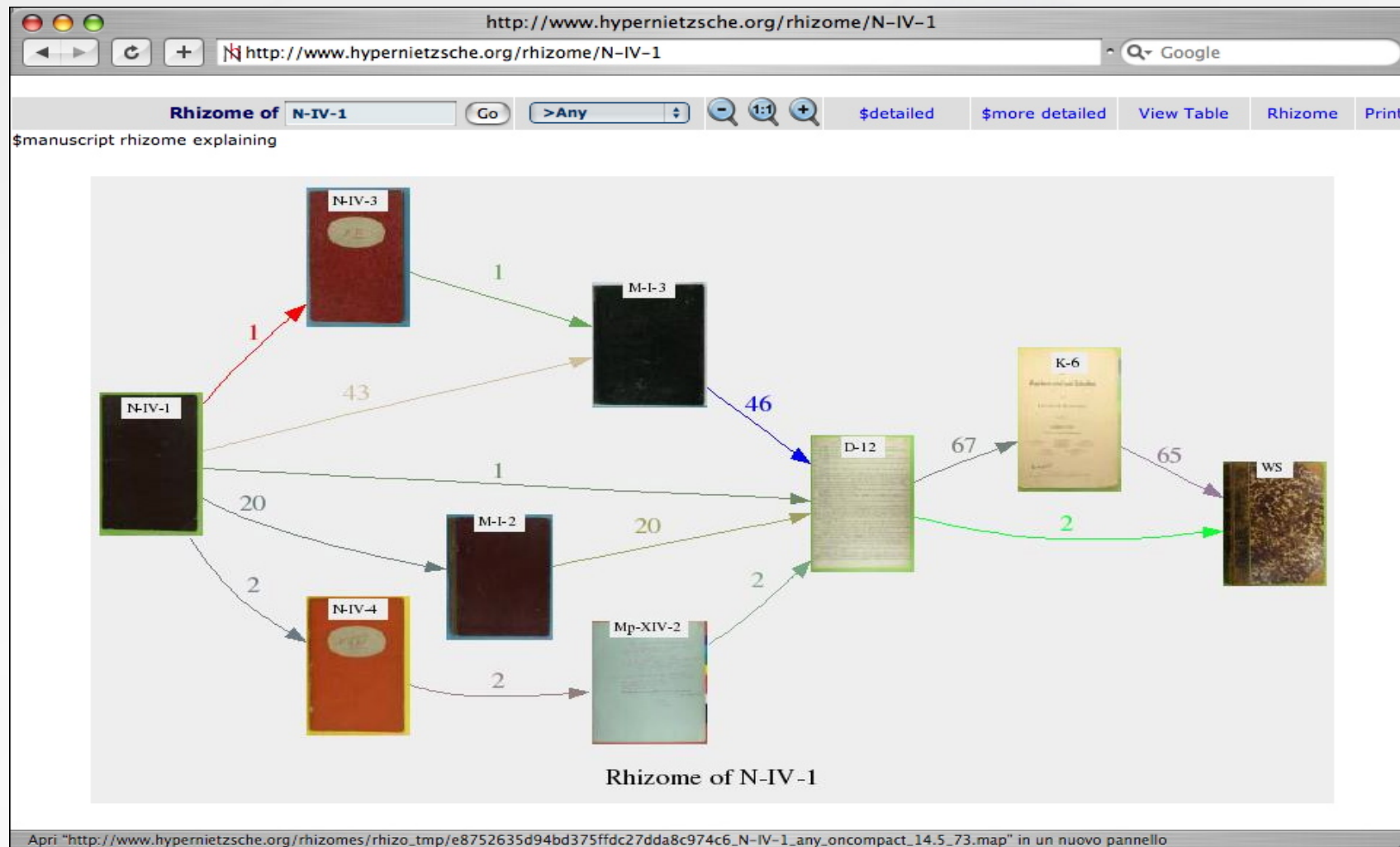
ContributionContentType

Disjoints

Logic View Properties View

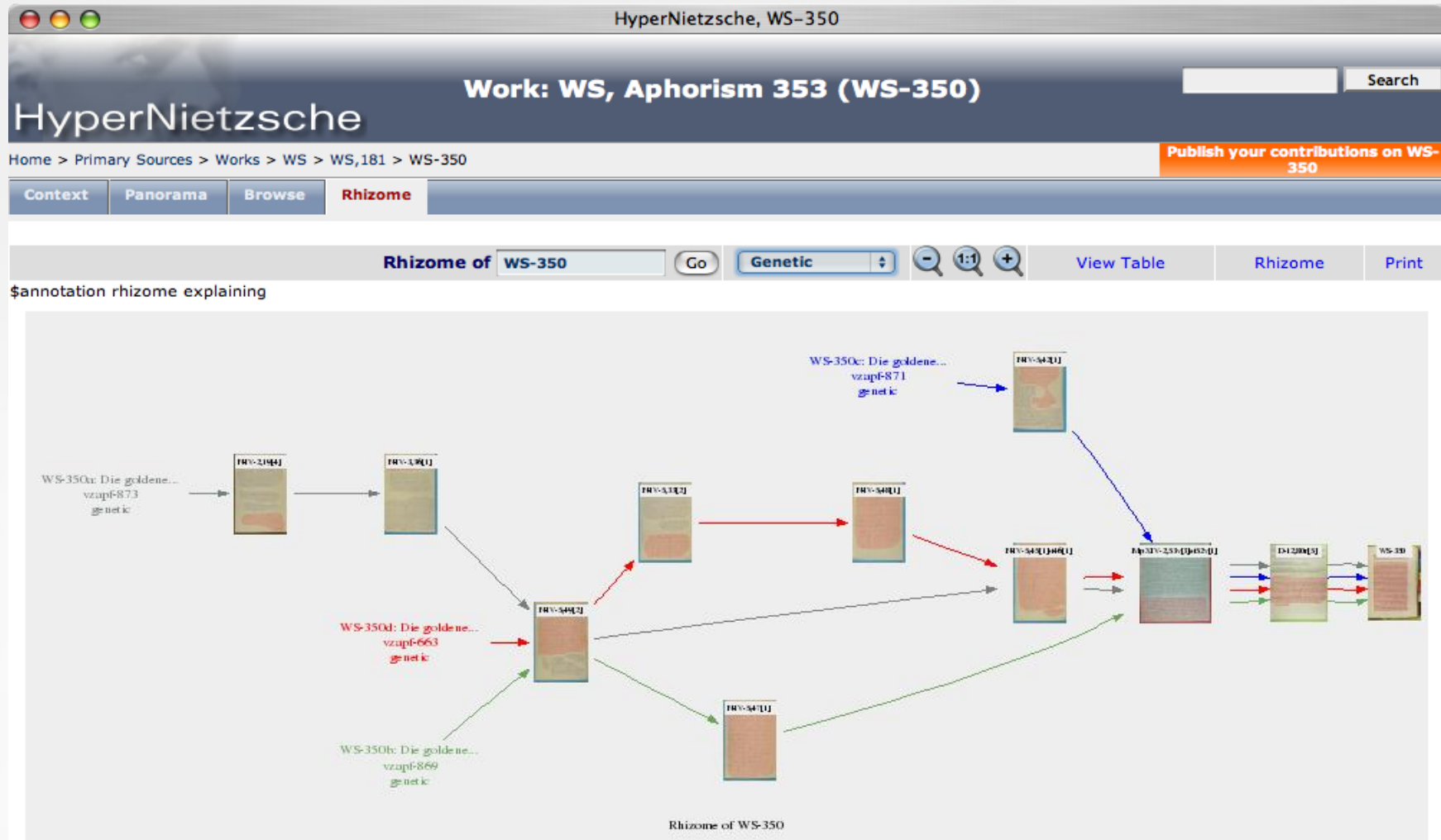
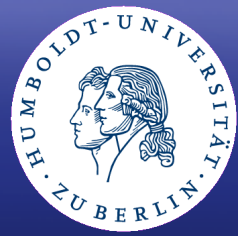
<http://trac.talia.discovery-project.eu/wiki/null/trac.talia.discovery-project.eu/wiki/HyperOntology#ParagraphInteractive>  
ontology: <http://trac.talia.discovery-project.eu/wiki/null/trac.talia.discovery-project.eu/wiki/HyperOntology>  
location: main ontology [hyper\_ontology]

# Manuscript Stemmata: A Specific Kind of Inferencing (1)





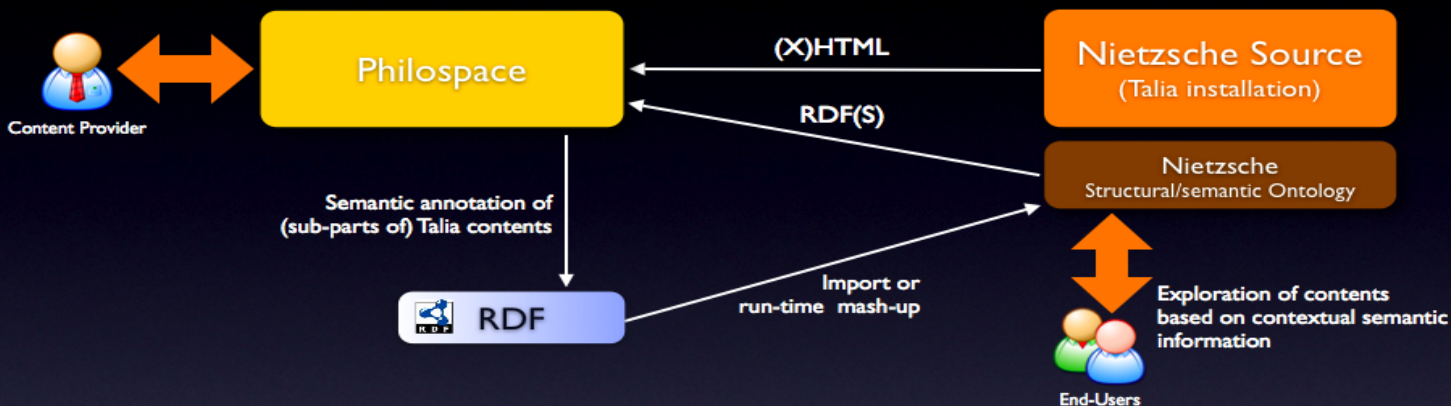
# Manuscript Stemmata: A Specific Kind of Inferencing (2)



# Talia/PhiloSpace: Annotations and Semantic Enrichment

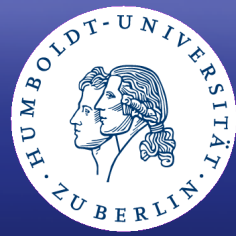


## Philo-Space and Talia(I)

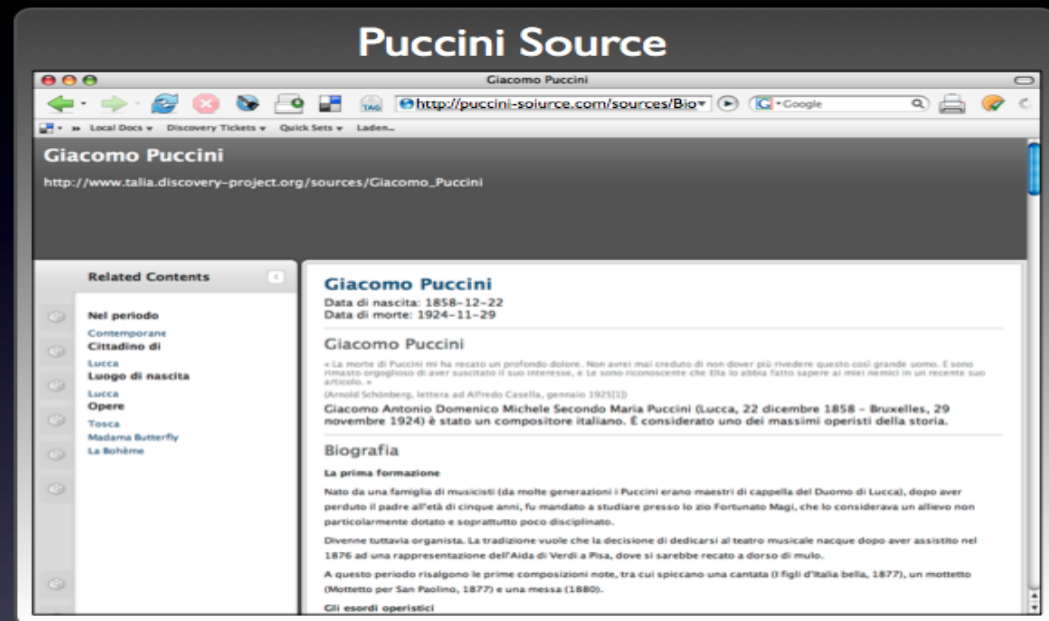


- Philospace can be **loaded with one or more Domain Ontologies**.
- Content providers use Philospace to **add semantic annotations to the contents** (already published in Talia).
  - E.g., “An essay *contradicts/cites* an other one”, “A sentence of an essay (fragment) *defines* the concept of Nature”, etc.
- End-users (e.g. scholars) **browse Talia contents and, contextually, semantic annotations** related to them.

# Semantic Enrichment Example (1)

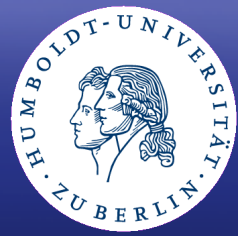


## Semantic enrichment in practice





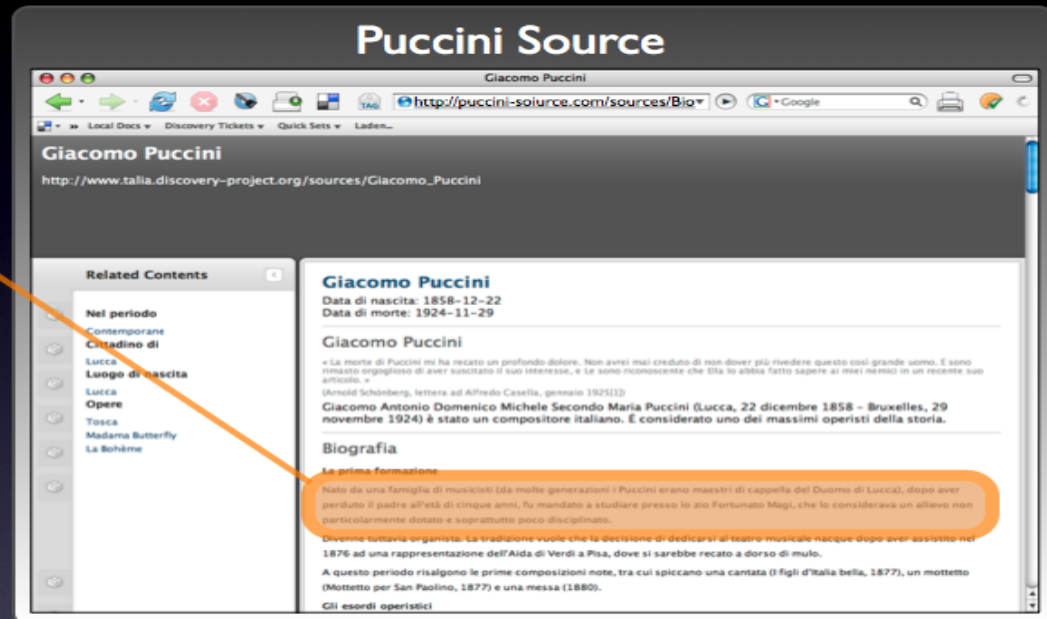
# Semantic Enrichment Example (2)



## Semantic enrichment in practice

### Stable URL

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# Semantic Enrichment Example (3)

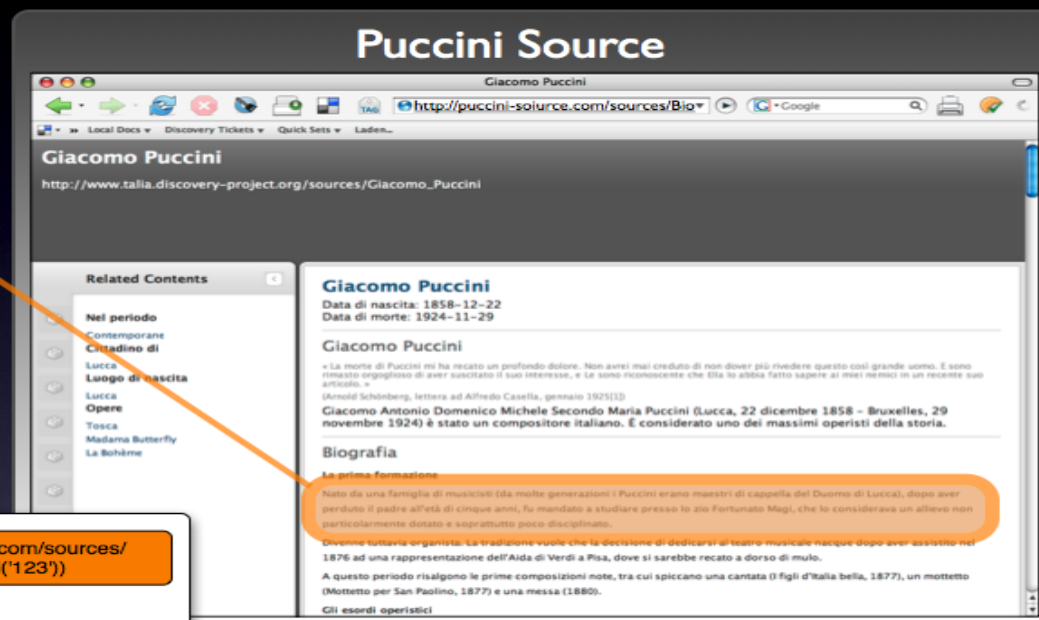
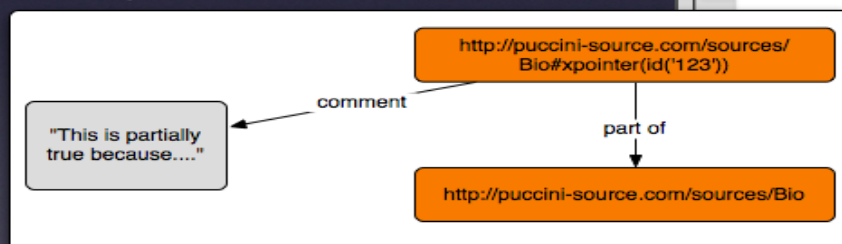


## Semantic enrichment in practice

### Stable URL

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### Example:



# Semantic Enrichment Example (4)

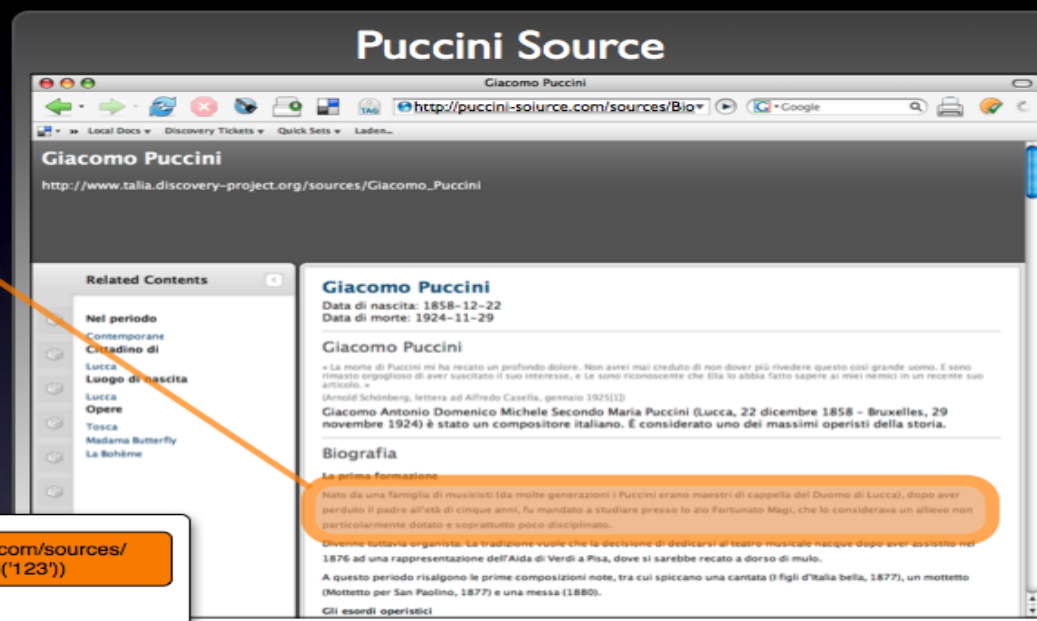
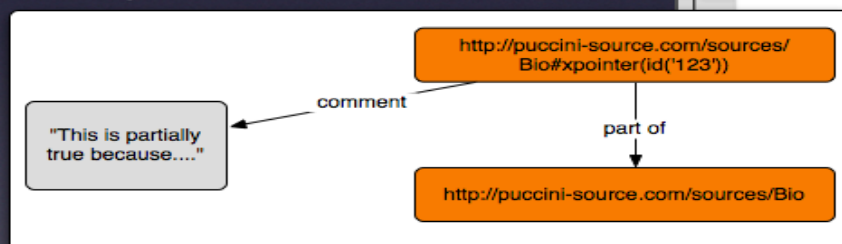


## Semantic enrichment in practice

### Stable URL

[http://puccini-source.com/sources/Bio#xpointer\(id\('123'\)\)](http://puccini-source.com/sources/Bio#xpointer(id('123')))

### Example:





# Semantic Enrichment Example (5)

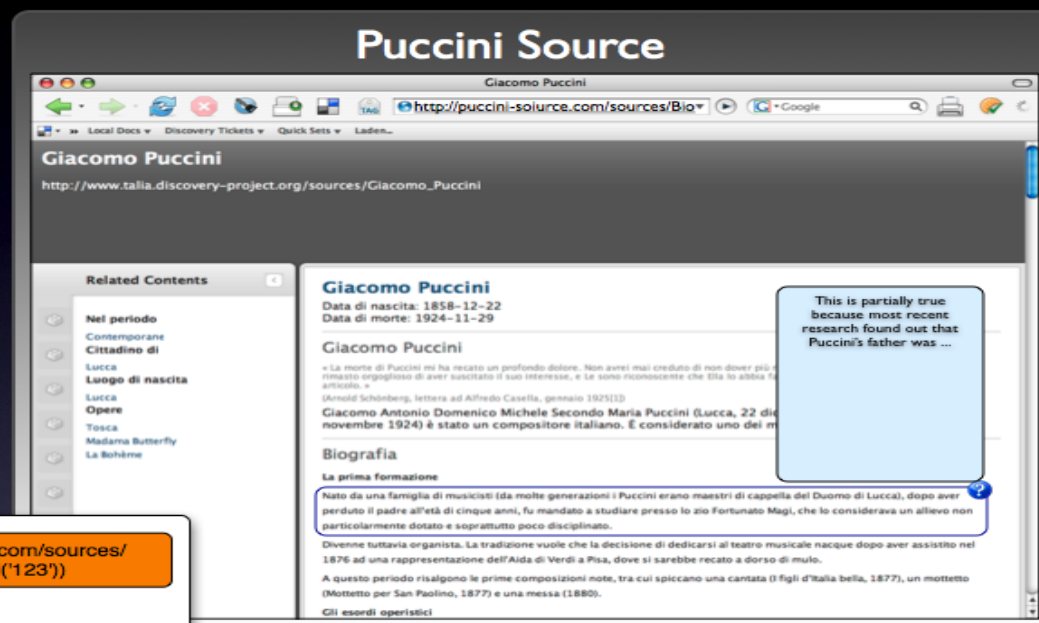
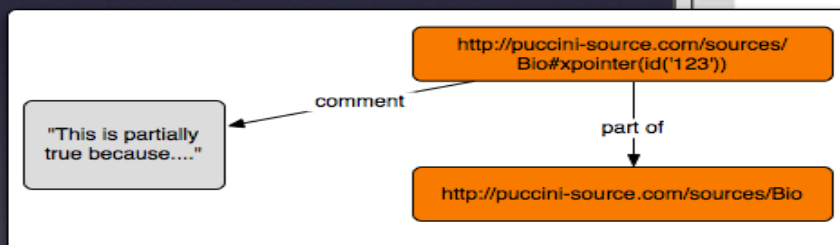


## Semantic enrichment in practice

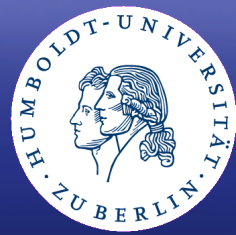
### Stable URL

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### Example:



# Hyper/Talia: Bidirectional Links



## Bidirectional Links

### Essay A quotes B

Quoted Essays

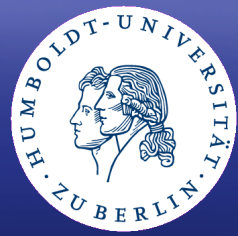


Quoting Essays



Essay B is quoted by A

# Hyper/Talia: Dynamic Contextualisation (1)



Primary Sources



Quoted Essays

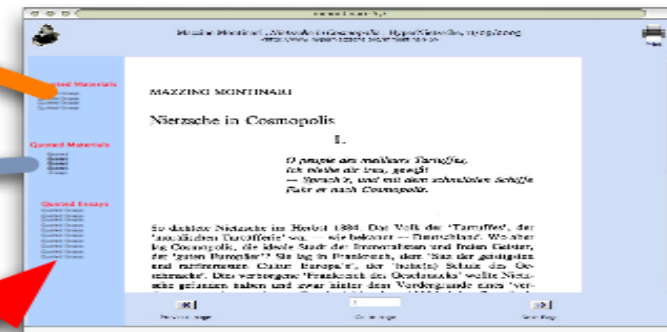


Quoting Essays



## Dynamic Contextualisation

Essay



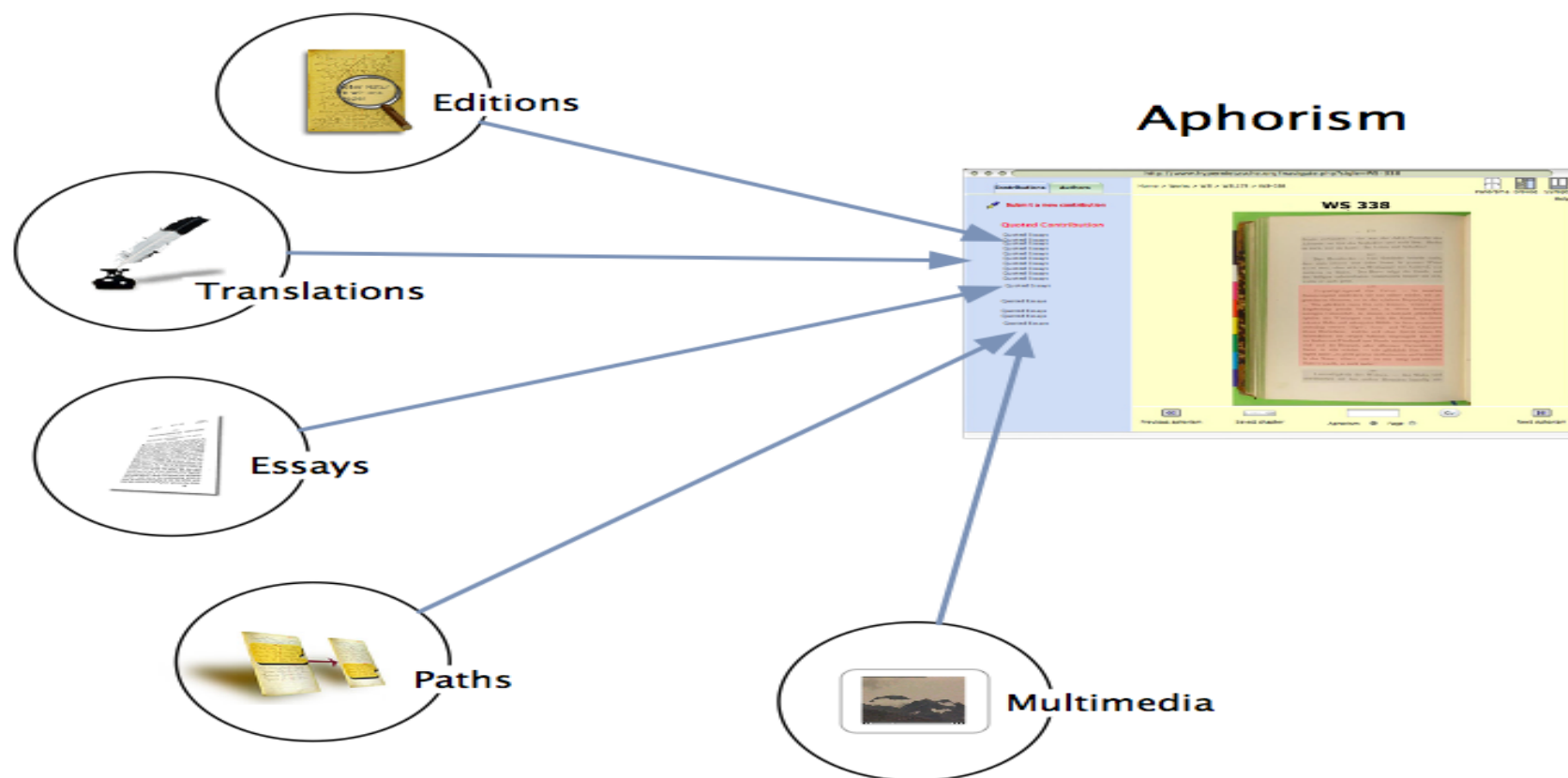


# Hyper / Talia: Dynamic Contextualisation (2)



## Dynamic Contextualisation

### Quoting Contributions



A faded, light blue background image of a large, multi-story building with many windows, likely a university building.

**... a nice basis  
for reasoning / digital heuristics!**

# Conclusion (1): It's the semantics, stupid!



- Converging agendas
  - Platforms such as Talia and communities built around those **need to be pluggable into Europeana**
  - Such platforms and communities must be capable to display Europeana resources **as part of their proper functional context**
- For the first two **interoperability requirements** to be viable at all a strong **semantic data layer** as part of Europeana and an appropriate **API** for specialised reasoning as a basis for digital humanities heuristics are vitally required
- We thus do not propose to fight Google – but rather **will provide a critical added value** Google doesn't offer (but may of course be working on, but in secret ...)
- In such a perspective, a strong profile characteristic for Europeana would – paradoxically – result from what may be perceived as a specific European weakness: the **scattered, heterogeneous and multilingual nature** of our cultural resources requiring **semantic foundations for conceptual interoperability!**



# Conclusions (2): It's the humanities, stupid!

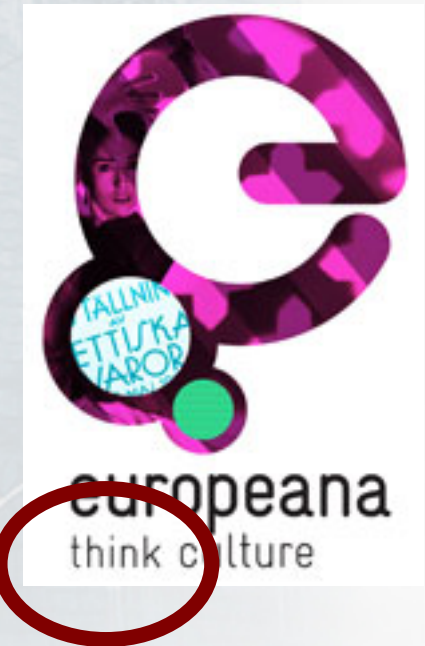


- A semantics aware Europeana delivers what has been asked for in the “Cyberinfrastructure for the Social Sciences and Humanities” report commissioned by the ACLS: **“Our Cultural Commonwealth”**
- Interoperability of Technology and Scholarship:
  - “The often institutionally enforced **disconnect between technician and scholar** is a microcosm of the much larger failure to consider the ends to which our powerful machine is put. [...] Unfortunately we are still in some instances thinking that **the non-technical scholar specifies the end in mind**, whereupon **the technician implements it**. **In that circumstance both lose**.” (Willard McCarty, Humanist Discussion Group 22.053)
- Europeana needs to
  - **build a strong semantic data layer** at the foundation of its large digital corpora
  - provide users with clearly defined **APIs to support specialised functions** for reasoning and digital heuristics
  - **work with the humanities computing community**
- **In that circumstance both win!**

# Conclusions (3): from 'Connecting' to 'Thinking'



Co-operation of a semantically based Europeana and of Digital Humanities communities enables the transition from



**Thank you for your patience and attention!**